

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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#8 1/2

8-2-03

JUL 14 2003

Serial No.: 10/021,097

Filed: 12/12/01

Applicant: Ghamaty, et al

For: Thermoelectric Device with Si/SiC Superlattice N-Legs TECHNOLOGY CENTER 2800

Examiner: Soward, Ida M

Group Art: 2822

FAX: 703-872-9319

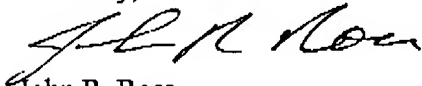
Sir:

In my letter mailed 6/30/03 responding to your 3/31/03 Office Action there was an obvious error in the first sentence reciting the basis for your rejection. I have corrected that error in the attached copy by a hand written insert.

As indicated subsequently in my 6/30/03 response your rejection was based primarily on Hilton and I explained that the teachings of Hilton even if combined with Elsner and Ghamaty do not suggest the present invention.

Please call me if you believe a discussion between us would be beneficial.

Sincerely,



John R. Ross

Regis. No. 30,530

PO Box 2138

Del Mar, CA 92014

858-755-3122

FAX RECEIVED

JUL 12 2003

TECHNOLOGY CENTER 2800

| | | | | |
|---|--------------------------|-------------------------|---------------------------|------------------------|
| AMENDMENT TRANSMITTAL LETTER (Small Entity) | | | | Docket No. |
| Applicant(s): | Serial No. 10/021,097 | Filing Date 12/12/01 | Examiner Soward, Ida M | Group Art Unit 2822 |
| Invention: Thermoelectric Device with Si/SiC Superlattice N-Legs | | | | |

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith is an amendment in the above-identified application.
☐ Small Entity status of this application has been established under 37 CFR 1.27 by a verified statement previously submitted.
☐ A verified statement to establish Small Entity status under 37 FR 1.27 is enclosed.
 The fee has been calculated and is transmitted as shown below.

CLAIMS AS AMENDED

| | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST # PREV. PAID FOR | NUMBER EXTRA CLAIMS PRESENT | RATE | ADDITIONAL FEE |
|--|-------------------------------------|-----------------------------|--------------------------------|---------|-------------------|
| TOTAL CLAIMS | - | - | 0 x | \$9.00 | \$0.00 |
| DEP. CLAIMS | - | - | 0 x | \$42.00 | \$0.00 |
| Multiple Dependent Claims (check if applicable) <input type="checkbox"/> | | | | | \$0.00 |
| TOTAL ADDITIONAL FEE FOR THIS AMENDMENT | | | | | \$0.00 |

- ☒ No additional fee is required for amendment.
☐ Please charge Deposit Account No. _____ in the amount of _____
☐ A duplicate copy of this sheet is enclosed.
☐ A check in the amount of _____ to cover the filing fee is enclosed.
☐ The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. _____
 A duplicate copy of this sheet is enclosed.
☐ Any additional filing fees required under 37 C.F.R. 1.16.
☐ Any patent application processing fees under 37 CFR 1.17.

Signature: *[Signature]* Dated: _____

| |
|--|
| I certify that this document and fee is being deposited on <u>6/30/03</u> with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231. |
| Signature of Person Mailing Correspondence <i>[Signature]</i> |
| Typed or Printed Name of Person Mailing Correspondence JOHN R. ROSS |

P11SMALL/REV06

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.: 10/021,097
 Filed: 12/12/01
 Applicant: Ghamaty, et al
 For: Thermoelectric Device with Si/SiC Superlattice N-Legs
 Examiner: Soward, Ida M
 Group Art: 2822

FAX: 709-872-9319

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TECHNOLOGY CENTER 2800

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.: 10/021,097
Filed: 12/12/01
Applicant: Ghamaty, et al.
For: Thermoelectric Device with Si/SiC Superlattice N-Legs

Examiner: Soward, Ida M
Group Art: 2822

Response of Final Office Action

Mailed 6/30/3

Commissioner of Patents and Trademarks
Washington, DC 20231

Sir:

This letter is in response to Office Action mailed 3/31/03.

REMARKS

*Hilton in view of
and
Elsner in view of Ghamaty.*

All of the claims were rejected under Section 103(a) as being unpatentable over [^]Elsner ~~in view of~~ Ghamaty. Applicant requests reconsideration.

The combination of the teachings of the three cited prior-art patents does not suggest the present invention. As explained in Applicants' response filed January 7, 2003, the present application claims a thermoelectric module comprised of n-legs with at least 100 very thin alternating layers of silicon and silicon carbide. Applicants have shown with actual test data performance improvements of almost 300 percent over prior art efficiencies (14% as compared to 5%) with projected efficiency improvements of 600 percent (30% as compared to 5%). Nothing in the prior art suggests the use of thin layers of Si and SiC for the n-legs of thermoelectric modules. There is nothing in the prior art to suggest the combination of the Hilton teachings with the teachings of Elsner and Ghamaty. Furthermore, if the combination were made it would not work. The combination would not produce a workable thermoelectric module. The Hilton device is an avalanche photodiode. Photodiode technology is completely different from thermoelectric technology. Most importantly Hilton teaches that the current flow is perpendicular to the planes of the Si and SiC layers (see FIG. 1 of Hilton). In the present invention the current flow must be parallel to the planes of the Si and SiC layers (see FIG. 4C of the present application). Thus, clearly there is no suggestion in these prior art patents to combine their teachings and clearly any such combination would not produce the present invention.

Conclusion

The combination suggested by the Examiner is not suggested anywhere in the prior art and if the combination were made, it would not work as a thermoelectric device. For the reasons given above Applicants submit that the present invention as claimed is a very important advancement in thermoelectric technology amounting to tremendous improvements in efficiencies which are not disclosed or suggested by the cited prior art or to the best of Applicants knowledge, any other prior art. Therefore Applicants respectfully request that the outstanding claims be allowed and the application be allowed to issue as a patent.

Respectfully submitted,

John R. Ross
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PO Box 2138
Del Mar, CA 92014
858-755-3122

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JUL 12 2003

TECHNOLOGY CENTER 2800

AMENDMENT TRANSMITTAL LETTER (Small Entity)

Applicant(s):

Docket No.

| | | | |
|--------------------------|-------------------------|--------------------------|------------------------|
| Serial No. 10/021,097 | Filing Date 12/12/11 | Examiner SOWARD, FIDA | Group Art Unit 2822 |
|--------------------------|-------------------------|--------------------------|------------------------|

Invention:

Thermoelectric device with Si/SiC superlattice N-type

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith is an amendment in the above-identified application.

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- ☐ A verified statement to establish Small Entity status under 37 FR 1.27 is enclosed.
- ☐ A fee has been calculated and is transmitted as shown below.

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| TOTAL CLAIMS | - | = | 0 | x \$9.00 | \$0.00 |
| DEP. CLAIMS | - | = | 0 | x \$42.00 | \$0.00 |
| Multiple Dependent Claims (check if applicable) <input type="checkbox"/> | | | | | \$0.00 |
| TOTAL ADDITIONAL FEE FOR THIS AMENDMENT | | | | | \$0.00 |

- ☒ No additional fee is required for amendment.
- ☐ Please charge Deposit Account No. _____ in the amount of _____
- ☐ A duplicate copy of this sheet is enclosed.
- ☐ A check in the amount of _____ to cover the filing fee is enclosed.
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|  | |
| Signature of Person Mailing Correspondence | |
| JOHN R. ROSS | |
| Typed or Printed Name of Person Mailing Correspondence | |

P11SMALLREV08